



Kennedy Space Center Radiation Protection Program

Mission

Ensure the safe use of radioactive materials, radiation producing machines, radio frequency/microwave radiation emitters, and laser or optical (ultraviolet, infrared, and visible) generating devices used at KSC and KSC facilities on Cape Canaveral Air Force Station, and to limit the exposure of personnel, facilities, and the environs to levels of radiation that are As Low As Reasonably Achievable (ALARA).

Safety Record

Historically, the KSC Radiation Protection Program has had an excellent radiation safety record. The program has enjoyed solid support from NASA, Department of Defense, contractor, university, and commercial user organizations. As a result of this cooperation and a through system of written use controls, field audits, and worker radiation safety training, there have been no abnormal personnel exposure incidents to date. Additionally, the program has been evaluated for compliance numerous times by the Nuclear Regulatory Commission, Department of Energy, and the State of Florida Bureau of Radiological Health. No regulatory infractions have been cited. Periodically radioactive heater and power sources, classified as Major Radiological Sources, are incorporated into deep space probes that are launched on expendable and manned missions. Through extensive safety reviews, contingency planning and preparation, worker and general public safety has always been maintained.

Charter

The mission and authority to exercise centralized control over the procurement, use, storage, transportation, and disposition of radiation emitting sources is delineated in KNPD 1860.1, "KSC Radiation Protection Program", KNPR 1860.1, "Ionizing Radiation Protection Program", and KNPR 1860.2, "Nonionizing Radiation Protection Program". In addition NASA KSC maintains a Nuclear Regulatory Commission (NRC) Broadscope Radioactive Material license, 09-11149-03 that authorizes possession and use of a wide range of radioisotopes and quantities. Under oversight of the KSC Radiation Protection Committee and it's Chairman, the KSC Radiation Protection Officer (RPO) manages and directs the Health Physics contractor supported center-wide program to ensure worker and general public protection, compliance with the NRC license, and applicable regulations of the Department of Energy, Environmental Protection Agency, Department of Transportation, and State of Florida.

Program Structure

The KSC Radiation Protection Program is built on the following three components:

I. **Radiation Use Authorizations** - The first component is the administration of a Radiation Use Authorization (RUA) program. Under the RUA program all uses of radiation sources and radiation emitting devices must be approved. Users apply for authorization to bring and use radiation sources and emitters on KSC. This is accomplished through a Radiation Use Authorization request submitted to the Health Physics contractor by the proposed user organization. The Health Physics contractor evaluates the RUA submittal looking at intended use, applicable source/emitter operating procedures, desired location, user qualifications and training, and any federal or state regulatory required licensing and documentation from the requester. The evaluation also includes performing theoretical calculations to define radiation hazard zones. Upon completion of this review by the Health Physics contractor, a formal RUA is drafted. that outlines the following:

- I. Applicable personnel protective standards
- II. Authorized sources and approved use/storage locations
- III. Authorized user personnel
- IV. Applicable customer operating procedures
- V. Hazard evaluation
- VI. Operational Provisions

The draft RUA is then sent to the KSC RPO for oversight review and concurrence. Upon satisfactory review by the KSC RPO, the package is forwarded to either the 45 SW RPO for review/concurrence if any of the use activity will take part on CCAFS, or directly to the Chairman of the KSC Radiation Protection Committee for final review/concurrence. Once the Chairman signs off the RUA, it is returned to the Health Physics contractor for distribution to the requester. RUA's are valid for one year and can be renewed through the above process.

II. **Surveillance Program**-The second component of the KSC Radiation Protection Program is surveillance. All RUA activities are subject to periodic audits by the Health Physics contractor to document user compliance to RUA requirements. Audits range from onsite administrative reviews that focus on posting and procedure compliance to field measurements of radiation sources/emitters. Additionally, some RUA's require quarterly source leak testing. Some radioactive material or x-ray machine users are required to wear personnel dosimetry. The Health Physics contractor distributes and collects the dosimeters monthly. Results are tracked to insure personnel exposures are in keeping with the ALARA principle and to look for any trends that might indicate a slackening in good radiation protection practices.

III. **Radiation Protection Committee** – The third component is the KSC Radiation Protection Committee. Quarterly representatives from NASA organizations

center-wide, meet to review and discuss RUA activity, radiation source/emitter inventories, RPO activities, personnel radiation dosimetry results, outside agency inspection reports and any major source launch preparation activities from the previous quarter.

Major Radiological Source Missions

Major radiological Source missions like Cassini in 1997, the two Mars Exploration Rovers in 2003, and the Pluto New Horizons mission in 2006 require significant preparation and planning. KSC-1903-Plan, “Radiological Controls for Major Radiological Sources (MRS)” identifies the requirements. Payload processing and contingency planning meetings start three years in advance of spacecraft arrival. The KSC RPO leads a detailed analysis of payload processing and source integration activities to insure source security and personnel radiation protection. Everything from a formal Dose Assessment Plan (DAMP) used to estimate personnel exposures to dress rehearsals is employed to minimize worker exposures. The KSC RPO in conjunction with a KSC appointed Coordinating Agency Representative (CAR) conduct contingency planning meetings with the Department of Energy, Air Force, KSC, and State & county officials to outline what onsite and offsite monitoring capabilities are needed to be in place to adequately and quickly evaluate radiological conditions following any launch anomaly. During launch countdown the KSC RPO directs a Radiological Control Center (RADCC) that controls and evaluates all onsite radiological monitoring assessment activities. The KSC RPO provides onsite radiation assessments and protection recommendations to the CAR. When there is the possibility for an offsite release, the Department of Energy, and State of Florida may set up an Advanced Launch Support Group (ALSG) to evaluate offsite radiological conditions. The CAR will combine RADCC evaluations with findings from the ALSG to issue worker and general public radiological protective action guidance.

Current Program Statistics

Radioactive material on RUA's: 2423
Radio Frequency Radiation sources on RUA's: 312
Laser/Optical sources on RUA's: 456
Personnel on Radiation Dosimetry Program: 78
Abnormal Radiation Exposures: 0
Federal & State Inspections: 0 discrepancies noted

Staffing

KSC Radiation Protection Officer

- Civil Service Health Physicist – Randall Scott/TA-C2/7-6958

Health Physics Contract Support

- 1 Health Physics Manager – Rod Nickell/CHS 022/853-5689
- 1 Health Physics Supervisor
- 4 Health Physics Specialists

Radiation Protection Program Photos



Radiation Counting Lab



Radioisotope Radiography Room



Mobile Radioagrophy



X-Ray Cabinet



Diagnostic X-Ray Unit



Industrial X-Ray Room



Accelerators



Space Trash



Radioisotope Labs



Radio Frequency Testing Room



Mobile RF Radiation Emitter



Fixed RF Radiation Emitter



RF Towers



UV Lamps



Laser Laboratorys



Ground Based Laser



Laser Etching Room



Mobile Based Laser



**Measuring/Protective
Equipment**



Radioisotope Heater Units



Radioisotope Power Units



Radiological Control Center



Radiological Air Sampling



Area Radiological Monitoring



Kennedy Space Center Radiation Protection Program Contacts

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